Interpolated sequences and critical L-values of modular forms

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It is well-known that the Apéry sequences which arise in the irrationality proofs for $\zeta(2)$ and $\zeta(3)$ satisfy many interesting arithmetic properties and are related to p-th Fourier coefficients of modular forms. We discuss how these connections persist in the general context of sequences associated to Brown's cellular integrals.

Moreover, Zagier recently expressed an interpolated version of the Apéry numbers for $\zeta(3)$ in terms of a critical L-value of a modular form of weight 4. We extend this evaluation in two directions. We first show that interpolations of Zagier's six sporadic sequences are essentially critical L-values of modular forms of weight 3. We then establish an infinite family of evaluations between interpolations of leading coefficients of Brown's cellular integrals and critical L-values of modular forms of odd weight.

This talk is based on joint work with Robert Osburn. Earlier joint work with Dermot McCarthy and Robert Osburn is featured as well.